MuniWireless

September 2006
Issue 003

The Voice of Public Broadband
www.muniwireless.com

The Broadband Agenda.

Sascha Meinrath on Digital Inclusion P18

Dianah Neff on The New City P32

Anthony Townsend on The Internet of Things P29

Becca Vargo Daggett on Public Ownership P26

and More...

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the public debate.

The debate over whether municipalities should own citywide wireless broadband networks has been simmering for some time, but it got an additional boost when the Boston WiFi Task Force issued its report to the Mayor of Boston several weeks ago.

The Task Force recommended that Boston search for a non-profit corporation to own and operate Boston's citywide wireless broadband network following a carrier-neutral, open-access and wholesale-only business model. The purpose behind the creation of an open network is to increase competition in the market for broadband services. In Boston, service providers typically charge between $35 and $42 per month. The Boston WiFi Task Force believes that by opening up the value chain, the monthly price for broadband access can be reduced to $15.

In my article about the Boston report on Muniwireless.com, I raised the issue of public funding and ownership: If broadband infrastructure is critical to economic development—if it is, as many cities state in their RFPs, the infrastructure for the 21st century—why isn't it treated as public infrastructure like roads and bridges? Why shouldn't a city pay for and own the network, and outsource the deployment and running of the network to private parties or, in the case of Boston, to a non-profit?

My article generated an intense online debate on the issue of public funding and ownership. Several readers, including a member of the Boston WiFi Task Force, posted comments on the pros and cons of cities owning wired and wireless broadband infrastructure. Those who oppose spending public money argue that cities are unqualified to operate telecommunications infrastructure and deliver services to the public.

Yet, proponents of public ownership have never suggested that cities themselves run and deliver the services over these networks. Indeed, when cities build roads and bridges, they hire private firms to design, build, maintain and upgrade them. The same is true for broadband infrastructure. St. Cloud, Fla., used public funds for its WiFi network, but hired Hewlett-Packard to manage it. The city also works with local companies such as the Geek Squad to deliver technical support.

There's an entire ecosystem of private individuals and businesses that will deliver value over a city's network, which, if publicly owned, will not be beholden to one operator whose primary goal is to exclude competitors and squeeze as much profit out of the network as required by its investors. We would rather not see the "cable model" again.

SCOTT LOWDEN

It might be worth looking at the public ownership model that European local governments have adopted for the deployment of fiber networks. In this model, the city participates in a consortium that builds the network. An example is Amsterdam's FTTH project (CityNet). The city contributed public money into a consortium that includes private companies, some of which are partners in the operation of the network.

Because the city is part owner, it gets to have a say in the way the network is built and run. If the city wants a network that is sophisticated enough for traffic management and public safety applications, it has a better chance of getting that kind of network built than if it simply hands over full ownership and control to the private sector. This model ensures that no private company has the power to exclude competitors and monopolize the infrastructure.

In the United States, there seems to be a great reluctance to spend public money on telecommunications infrastructure, which everyone agrees is critical to economic growth and prosperity. Somehow it is considered unnatural for cities to make the necessary investment in fiber and wireless networks. Yet, cities think nothing of spending millions of dollars for sports stadiums, NASCAR museums and >>

traffic rotundas that do nothing more than send cars in four directions.

While one can argue that a city's status as an owner ensures that the network is not held hostage to the whims of one company whose goals may be at odds with the needs of the community, there is also a grave danger that the network will be used to monitor citizens, censor their communications and control what they can see and do on the network. Civil liberties advocates warn against the censorship and privacy abuses that could arise if the local government owns the network.

These are legitimate concerns, but isn't this already happening on private networks? AOL's privacy breaches, Verizon/AT&T/BellSouth's spying activities on behalf of the National Security Agency, Yahoo's and Google's policy of turning over information to the Chinese government: These have already proven that private companies are more than willing to betray the interests of their users, and to act as accomplices of and even surrogates for oppressive governments.

Although I prefer to see greater public investment in broadband infrastructure, I realize that cities face political realities that make it difficult to roll out these networks if public funds are used. In Boston and many other cities it may be faster to get a citywide network up and running by going through a non-profit or getting a vendor to build and own the network. In these instances, cities have to ensure that their agreements with the ultimate network owner clearly state that the network will be operated on an open, carrier-neutral basis. These agreements must have penalties for failure to comply and cities must actively monitor the network owner's operations.

It is here that we will see the battle between the public interest (cheap broadband, open networks) and the network owner's profit-maximizing goals. After all, it is unfair to expect a private enterprise to spend $25 million on a citywide wireless network without letting it earn a reasonable return within a short period. What makes me optimistic is that cities are experimenting with different models of public-private partnerships. There is no one-size-fits-all solution and ultimately, the model that works is that which is politically and financially feasible. I just hope that elected officials are courageous enough to demand the kind of network that benefits the entire community in the long term. **MW**

Esme Vos

—Esme Vos, Founder
MuniWireless.com

MuniWireless
The Voice of Public Broadband

FOUNDER, MUNIWIRELESS.COM
Esme Vos

EDITORIAL DIRECTOR
Gary A. Bolles

ART DIRECTOR
Nicole White

PRODUCTION DIRECTOR
Rhett Hall

CONTRIBUTORS
Andy Abramson
Becca Vargo Daggett
Sascha Meinrath
Dianah Neff
Joseph C. Panettieri
Mike Perkowski
Patricia Perkowski
Elizabeth Svoboda
Anthony Townsend

PUBLISHER
Al Perlman
al@muniwireless.com | 516.352.7808 Ext. 150

VICE PRESIDENT OF SALES
Amy Katz
amy@microcast.biz | 978.921.1112

SALES DIRECTOR
Nancy Puglisi
nancy@muniwireless.com | 512.263.2692

VICE PRESIDENT OF EVENTS
Heidi Kleinmaus

PROJECT MANAGER
Katie Harrigan

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Expert Training in Mesh for Munis and Resellers

Coming this fall to the San Francisco Bay Area, Chicago and Atlanta
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Two programs are available:

1. ***One-day Overview for city planners, business managers, public officials, consultants and senior technology managers*** who need an unbiased, technology-neutral view of financial, technical and architectural options, and a practical methodology for evaluating a broadband wireless implementation in their community.

2. ***Three-Day Boot camp for engineers, resellers, systems integrators, IT staffers*** and others who need RF design skills, balancing the requirements of service quality with minimum capital and operations cost.

***

These are the top programs of their kind in the industry, combining MuniWireless.com's depth of knowledge in municipal wireless, with DoceoTech's proven ability to deliver best-of-breed wireless training. Both programs have limited seating capacities, so please sign up quickly.

***

DATES/TIMES FOR EVENTS:

Metro One-Day Workshops		*Three-Day Boot Camp*	
San Francisco Bay Area	Oct. 17	**San Francisco Bay Area**	Oct. 18-20
Chicago	Nov. 28	**Chicago**	Nov. 15-17
Atlanta	Dec. 5	**Atlanta**	Dec. 6-8

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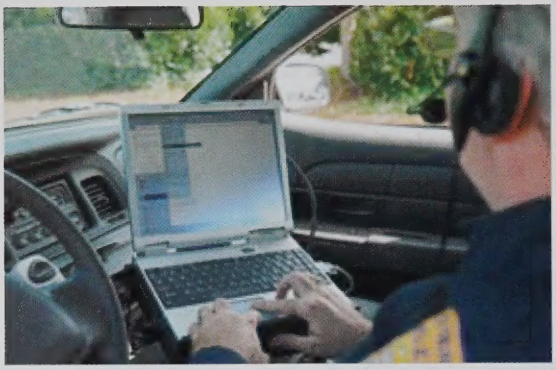

Public safety field personnel make daily decisions that affect their own safety as well as the safety of the citizens they protect and serve. Safety and service effectiveness increase when field personnel base their decisions on more sources of relevant information. By extending network access to the field—including vehicles in motion—Cisco® Outdoor Wireless Solutions improve public safety, facilitate collaboration throughout the chain of command and with other agencies, and increase agency productivity.

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- Cisco Aironet 1300 Series Outdoor Access Points/Bridge—Provides high-speed, cost-effective wireless connectivity between multiple fixed or mobile networks and clients; the ruggedized platform is ideal for public access in outdoor hotspots, network connections within a campus area, or outdoor infrastructures for mobile networks and users
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Cisco Outdoor Wireless Solutions increase the ease of deploying and maintaining outdoor wireless networks, helping to justify the investment for public safety agencies of all sizes. Cisco Outdoor Wireless Solutions meet the requirements of public safety agencies because they are easy to deploy, maintain, manage, expand, and secure.

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For more information about Cisco Outdoor Wireless Solutions, visit www.cisco.com/go/wirelessmesh

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With Cisco Outdoor Wireless Solutions police officers can file reports, process citations and upload the information they need right in their car instead of back at the station. Mobile access to secure data, voice, and video keeps law enforcement officers, emergency response teams, and every other municipal employee right where they're needed most.

Explore all the advantages of outdoor wireless at www.cisco.com/go/wirelessmesh

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Cisco Systems

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the broadband agenda

page 17 The proliferation of high-speed digital connectivity has the potential to change the world. The decisions we make today could have long-lasting effects not only on our communities, but on the ability of broadband to be implemented ubiquitously in the U.S. and abroad. These four essays by industry leaders examine not only our opportunities, but our responsibilities as well.

p.18 **DIGITAL INCLUSION: SOCIAL JUSTICE IN A COMMUNICATIONS AGE** by Sascha Meinrath

p.26 **MAKING THE CASE FOR PUBLIC OWNERSHIP** by Becca Vargo Daggett

p.29 **ENABLING THE INTERNET OF THINGS** by Anthony Townsend

p.32 **THE NEW CITY** by Dianah Neff

also

p.35 **TECHNOLOGY:** Here are some of the hottest new WiFi-friendly gadgets, what they can do and how they might add fuel to the muniwireless revolution.

p.40 **MARKET MAP:** If public broadband represents the next strategic IT upgrade, it is critical for anyone involved in the public broadband ecosystem to understand what happens in an initiative of such scale.

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FREE DOWNLOADS

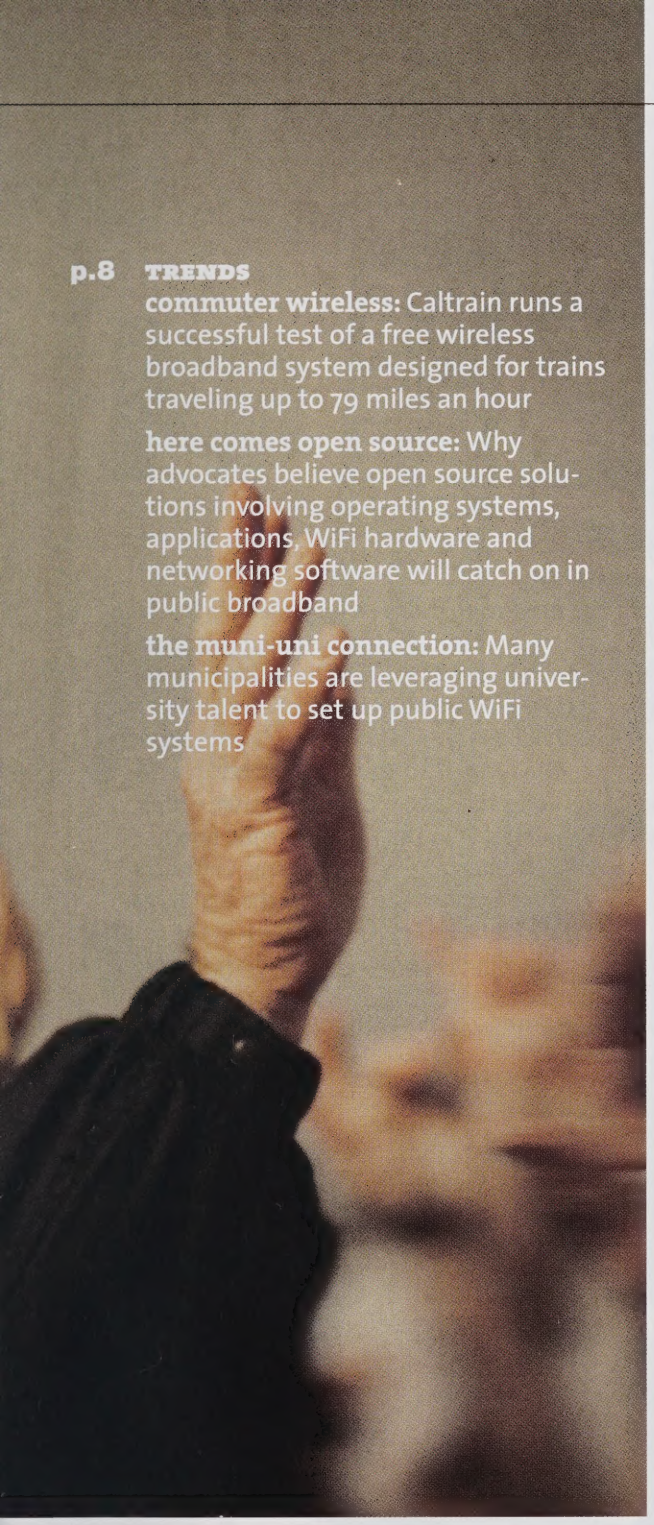
September 2006 Update of Wireless Cities and Counties in the U.S. This is the most recent update to our free July 2005 market report. The number of planned deployments has gone up to 135 this year from 34 last year. The total number of implementations and planned deployments is now 306, up from 264 in June.

Strategies for Wireless Public Safety Networks This free Webcast provides decision-makers with background and insights on the critical requirements for public safety networks.

WiFi for an Efficient Municipality This free Webcast focuses on how broadband wireless is changing cities to make them more efficient and responsive to their communities.

FEATURE SECTIONS

Municipal Wireless: Regulatory projects, policies and legislation
Community: Social relevance and impact on everyday life
Applications: Practical implementations of wireless at work
Technology: News, information and recent developments



p.8 **TRENDS**

commuter wireless: Caltrain runs a successful test of a free wireless broadband system designed for trains traveling up to 79 miles an hour

here comes open source: Why advocates believe open source solutions involving operating systems, applications, WiFi hardware and networking software will catch on in public broadband

the muni-uni connection: Many municipalities are leveraging university talent to set up public WiFi systems

TO OUR READERS:

Luck, sometimes, is the residue of design. And sometimes luck is just luck. For this issue of *MuniWireless Magazine* we are very thankful for our good fortune, however it evolved.

Let me explain. We feel very fortunate to be able to present the package of four essays we are calling The Broadband Agenda. We think they are provocative, well-written and prescient, crystallizing many of the issues that are on the minds of leaders within the municipal wireless community.

We would like to say we planned this whole thing out strategically, from the inception. But that wouldn't quite be true. What happened was we were late in planning the articles for this issue so, rather than assigning them to journalists, we went directly to thought leaders in the community and asked them to write about themes they were passionate about.

We didn't see the coherence among the themes until the essays actually arrived in our in-box. At that point we knew they were meant to go together, so we rejiggered the magazine at the last minute and the result is what you have in your hands. Was it luck? Design? Whatever forces were at work, we are pleased to provide this forum and invite you to share your own thoughts and comments. You can send them directly to me at al@muniwireless.com.

While I have your attention, I'd like to tell you about a new initiative we are undertaking at MuniWireless. In conjunction with DoceoTech Inc., we are offering comprehensive technical training classes for municipal mesh networks. These are available in two formats: **(1)** A one-day workshop for city planners, business managers, public officials, consultants and senior technology managers who need an unbiased, technology-neutral overview of their options; **(2)** A three-day boot camp for engineers, resellers, systems integrators, IT staffers and others who need RF design skills.

Training classes are available this fall in the San Francisco Bay Area; Chicago and Atlanta. They are starting to fill up, so if you are interested, please go to MuniWireless .com for more details. And while you're there, please fill out your subscription form to ensure that you keep receiving *MuniWireless Magazine*. Finally, I hope to see many of you Oct. 23 and 24 at our upcoming MuniWireless conference in Minneapolis. Early Bird pricing is still available until Sept. 25. Details, of course, are available at MuniWireless.com.

TRAINING

One-day seminars for city planners, business managers, public officials, consultants and senior technology managers. Locations: San Francisco Bay Area, Chicago, Atlanta. **Three-Day Boot Camps** for engineers, resellers, systems integrators, IT staffers and others who need RF design skills. Locations: San Francisco Bay Area, Chicago, Atlanta.

OUR FINAL 2006 CONFERENCE

MuniWireless06: Midwest Oct. 23-24, Marriott Minneapolis City Center, Oct. 22 , Special Event: Digital Inclusion Day.

Wireless to go

Caltrain takes the first step in providing broadband for commuters

by Elizabeth Svoboda

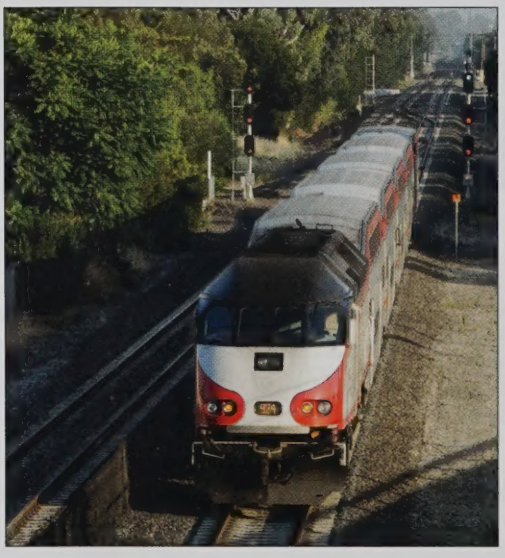
RESIDENTS OF THE SAN FRANCISCO BAY AREA usually have multiple wireless options when they boot up their laptops in parks or fast-food joints. But getting connected on public transit, including the Caltrain commuter line running from San Francisco to San Jose, hasn't really been an option. Commuters who type fast and get lucky can sometimes check e-mail during station stops, but that's about it.

This summer, Caltrain took the first step toward fixing that, completing trials of a free high-speed broadband system designed for trains traveling up to 79 miles an hour. The trials were conducted on 16 miles of track between Millbrae and Palo Alto and cost $334,000 to implement.

The results? So far, so good: Multiple riders were able to search the Internet, watch streaming video and complete file downloads as the train barreled along. Caltrain's venture is on pace to become the first large-scale mobile Internet connection in the country, blazing a technological trail for similar projects in other areas.

Silicon Valley commuters have clamored for wireless access ever since laptops with built-in receivers started popping up years ago, says Randy Rudolph, Caltrain's director of information technology. The problem was finding a reliable way to meet the demand, and

The broadband system uses WiMAX and is designed for trains traveling up to 79 miles an hour.



CHUCK FOX

Conference Dates: Tuesday January 23rd and Wednesday January 24th, 2007
Metro Toronto Convention Centre • Toronto, Ontario, Canada

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Peter Rogers,
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Dr. Giuseppe Paruolo,
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ITAC Information Technology Association of Canada

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Decima's report on wireless

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"International Case Studies for Enhanc Cutting Costs, Improving Efficiency and

A Message from our Conference Chair:

Dear Delegates,

As Chairman of the program, it is my pleasure to invite you to the Wireless Cities Summit. This is an unparalleled opportunity to learn from those who have experienced first hand the triumphs and trials of municipal wireless projects in United States, Canada and Europe.

Learn about the latest tactics for building, managing and enhancing city-wide network infrastructure. Also attend sessions on specific applications for the network that enable you to maximize the value of your network. See how the network and these applications together can boost your city's economy and revenues, improve efficiency, cut communication costs and maximize public safety.

This is a great occasion to network with your colleagues to share views and ideas. I encourage you to join delegates from North American and European municipalities and stakeholders in the wireless industry at this highly educational event.

Craig Settles, *President,*
SUCCESSFUL.COM
and *Author*, "Fighting the
Good Fight for Municipal Wireless"

Hear International Case Studies for Enhancing Economic Growth, Public Safety, Cutting Costs, Improving Efficiency and Providing New Service Opportunities

- Are you developing or considering initiating a wireless Internet network for your city?
- Are you aware of real economic benefits experienced by municipalities that have deployed wireless networks?
- Are you on top of the latest technological developments in wireless technologies?
- Do you want to improve cost and technical management of your local network?

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City of Grand Rapids, Michigan
City of Portland, Oregon
City of Fredericton, New Brunswick
Toronto Hydro Telecom
New York City Wireless
Civitium and Harlem, NY
Lakehead University, Trent University, Health Canada, Toronto Public Health
Craig Settles, California
In addition: City of Hamilton, Ryerson University, University of Toronto Excelsio Communications, RoamAD New Zealand, Keewatin-Patricia District School Board, City of Bologna – Italy, Ile San Fil – Montreal, Taipei—Taiwan

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This event will show you how to....

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- CREATE a successful and attractive request for proposal (RFP)
- DIFFERENTIATE your local economy
- BOOST your city's revenues
- MAXIMIZE public safety
- CUT communications costs
- SECURE partners for your city-wide WiFi project

Whether you have started a network or are in the planning stages, this conference will deliver the best practices and case studies needed for million dollar decisions...
Over 250 cities and municipalities in North America have announced plans to build municipal WiFi networks...from small communities to huge cities including, San Francisco, Toronto, Boston, New Orleans, Houston, Vancouver and Chicago. Will you be a part of this revolution of cutting costs, generating revenue and improving public safety? Your first step - this conference.

VENDOR TEAM ALERT! Telecom companies, technology suppliers, equipment vendors, software/applications providers and consultants — establish strategic alliances and move your business forward!
Take advantage of this exclusive opportunity to network with key players among North American municipalities and the wireless technology industry. U.S. and Canadian cities, towns and counties will spend nearly $1 billion over the next three years to build municipal-owned wireless broadband networks.

Register Today....Don't miss this unique opportunity to network with key players among North American municipalities, universities and the wireless technology industry. Register now!!! Call **1-866-298-9343** or e-mail registrations@strategyinstitute.com.

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ing Economic Growth, Public Safety, Providing New Service Opportunities."

How you will Benefit:

Cities, Municipalities, Communities and Universities:

Maximize Public Safety: Deploying WiFi networks to improve efficiency and information accessibility for police, emergency and fire departments

Boost your city's revenues: Securing streams of funding for your budget and increasing investment allocation in your municipality

Differentiate your local economy: Attract and retain 'knowledge industries' looking for a location that offers an innovative, productive and exciting environment

Cut Costs: Delivering broadband Internet access to schools, and low-income households to enhance economic growth in your municipality.

Confidently Respond to Health Concerns: Assessing the risk associated with exposure to WiFi networks to educate your community.

Secure Partners: Evaluating your consultants and building a successful and attractive Request for Proposal (RFP).

Broadband Suppliers:

Network with key decision-makers: Identify new market opportunities in North America.

Elevate your profile: With city with mayors, councilors, CAOs, CIOs and IT directors.

Applications/Software Providers:

Present Your Latest Software: Network with the municipal IT managers and WiFi network administrators.

Spot Opportunities: Benchmark against other companies from around the globe and obtain a glance to the future developments.

Consultants:

Be Where the Action is: Hear the insightful presentations on some of the most successful international case studies and network with municipal decision makers from Canada, US and Europe.

Learn New Developments: Recognize advantages and limitations of the next generation of wireless technologies that can significantly improve municipal WiFi networks.

What Past Attendees said about our Municipal Summits:

"Excellent, knowledgeable, and organized" "Dynamic, smart" "Very objective"
"Excellent balance of presentation levels. Not too simple, not too complex"
"Overall I have enjoyed this day very much and look forward to the rest of the week"

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Hear from these Industry Leaders:

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Deputy Mayor and *Bologna City Manager for Communication and ICT,*
BOLOGNA, Italy

John Jung,
Chairman,
INTELLIGENT COMMUNITY FORUM

Robert Bradley,
Director of Consumer and Clinical Radiation Protection,
HEALTH CANADA

Arne Solvberg,
NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY,
Trondheim, Norway

Frederick Gilbert,
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LAKEHEAD UNIVERSITY
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Dana Spiegel,
Executive Director,
NYCWIRELESS,
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WIRELESS CITIES SUMMIT

Day One: Tuesday January 23rd, 2007

7:30 AM **Registration and Continental Breakfast**

8:15 AM **Opening Remarks from Chairperson**

Craig Settles,
President,
SUCCESSFUL.COM

Opening Presentation

8:30 AM **Setting the Stage: An Analysis of Wireless Broadband Networking in North America**

Hundreds of communities and municipalities are developing community/public WiFi systems. Our opening presentation will discuss case studies from Canada and the US and explore the following issues:

- Presenting the current state of wireless broadband deployment in Canada and the US
- Analyzing the role that community-based organizations, municipalities and other public entities play in the development and accessibility of wireless broadband infrastructure
- Delivering the benefits/advantages of community-based, public models of wireless broadband provision, particularly in relation to commercial alternatives
- Presenting models and best practices in community/public wireless networking that maximize these benefits

Community Wireless Infrastructure Research Project Team (CWIRP):

Dr. Catherine Middleton, *Associate Professor, School of Information Technology Management, Faculty of Business*, RYERSON UNIVERSITY, Toronto

Dr. Andrew Clement, *Professor, Faculty of Information Studies*, UNIVERSITY OF TORONTO

Keynote Presentation: Westminster Wireless City Project, London, UK

9:15 AM **Revolutionizing the City's Business through the Innovative Use of Wireless Technology: cutting costs, improving efficiency of city services and enhancing public safety**

Westminster City Council and its technology partners have completed the first phase of a large- scale Wireless City pilot scheme that has been operating across three different areas of the city.

- Delivering significant cost savings for the city
- Transforming city council services
- Improving safety in the city and fighting criminal activities

Improve your city's services and learn how you can benefit from Westminster's experience in your city.

Peter Rogers,
Chief Executive,
WESTMINSTER CITY COUNCIL, LONDON, UK

10:00 AM **Sponsor Exhibit Area – Networking Break**

This showcase exhibit will feature select emerging technology vendors, systems integrators and service providers to discuss their work with local government professionals.

Case Study: City of Portland, Oregon

10:30 AM **Business Model for the City of Portland**

Portland is competing at the global level to attract and retain businesses and having the right infrastructure increasingly means digital, ubiquitous and unwired. It also plays a key role in building an informed and educated citizenry by giving residents access to key government, community and business services. Learn how the city chose the most suitable business model for their project to provide free and dependable Internet access to their residents.

- Business Model: Open service provider
- Building a public –private partnership: Attracting a private company
- Creating a wireless vision and drafting a successful RFP
- Assessing cost and benefit for the city

Understanding the idea-generating phase to the full deployment in Portland and apply it to your city.

Logan Kleier, *Project Manager for Unwired Portland,* CITY OF PORTLAND, USA

Matt Lampe, *Chief Technology Officer*, CITY OF PORTLAND

Case Study: Oakland and Anaheim, California

11:15 AM **The Business Case for Your Municipal Wireless Network: Understanding the Economic, Social and Political Value of Your Wireless Project Through an Effective Cost/Benefits Assessment Using Oakland, Anaheim and Other California Cities as Case Studies.**

Providing low or no-cost Internet access for your constituents with a wireless infrastructure deployment can benefit the community by making government more efficient, enhancing public safety and spurring economic development. This session helps you determine if wireless broadband is a good fit for your community and what you should consider while assessing costs and benefits.

- Identifying the basics foundation of the business case for wireless
- Creating the business plan based on stakeholder input
- Calculating estimated budget and defining the marketing plan
- Assess returns on investment - it's about more than money

Learn what factors to consider for your analysis of how this technology can impact your various constituent groups.

Craig Settles, *President*, SUCCESSFUL.COM, and *Author,* "Fighting the Good Fight for Municipal Wireless", OAKLAND, USA

12:00 PM **Sponsor Exhibition — Networking Luncheon**

This is your opportunity to make new business contacts and discuss the ideas presented in the morning session.

Keynote Address

1:30 PM **Legal Issues Affecting Municipal Broadband Projects: Delivering Solutions for Your Legal Challenges to Ensure Effective Project Implementation**

Jim Baller, *Senior Principal,*
THE BALLER HERBST LAW GROUP, P.C.C.,
Washington, USA

Day One: Tuesday January 23rd, 2007 *(continued)*

2:15 PM **Broadband Wireless Access, Technology, Applications and Trends: Steering a Course to Greater Competitiveness and Productivity**

Presentation from leading wireless technology provider. Siemens is delivering equipment supply, implementation and services for major municipalities including Toronto. Their offering is based on leading-edge, third-generation wireless technology that more than meets world class city criteria for reliability, speed and scalability."

Our expert will discuss:

- Technology Landscape of Broadband Wireless Access
- Emerging Applications for Broadband Wireless Network
- Market Drivers and Requirements
- Customized Architecture — Multiple Deployment Models
- Integration, Service and Backhaul Scenario Analysis
- BWA Future — Development with Fixed and Mobile Convergence

Learn what kind of technology a world class municipality needs in order to steer a course to greater competitiveness and productivity.

Mark VanderHeyden, *Vice President, Carrier Networks,* SIEMENS CANADA LIMITED

3:00 PM **Sponsor Exhibit Area – Networking Break**

Case Studies: Trondheim (Norway), Hamilton (Canada) and Taipei (Taiwan)

3:30 PM **Enhancing Economic Growth and Innovations in Your Municipality: Acquire Tools to Maximize Your Wireless Network Investment Return and Impact Your Local Economy**

Learn how to join the worlds most competitive and intelligent local communities and transform your economy by delivering the network to local universities, schools and SMEs.

- Analyzing what local governments should consider in planning municipal wireless networks
- Deploying a wired and/or wireless citywide broadband network
- Examining the network's impact upon a city's economic development - Building a Broadband Economy
- Addressing the digital divide and other social issues
- Attracting and retaining 'knowledge industries
- Building a political consensus
- Selecting appropriate applications

Arne Solvberg, NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY, Trondheim, Norway
Terry Whitehead, *Chair of Wireless Committee,* HAMILTON
John Jung, *Chairman,* INTELLIGENT COMMUNITY FORUM
More to come...

4:15 PM **The next generation of wireless technologies: Recognize attributes and limitations of technology that can improve your wireless broadband network**

- Aligning technology initiatives with end users needs
- Components of the broadband network
- Mobile workforce technology

Learn your pivotal technology options and the evolution in the technology scene.

Mike Dixon, *VP, Wireless Networks,* MOTOROLA CANADA LTD.

5:00 PM **Do's and Don'ts for Project Planners and Implementers: Avoid Costs and Mistakes in Wireless Deployment**

Today, several deployed North American networks don't work as well as they should, and one can see the same equipment performing very differently from one network to the next. Find out why so you can avoid repeating the most common mistakes.

- Understanding the phases involved in a network deployment
- Understanding the importance of the network design process
- Creating effective network management
- Drafting a business plan accurately accounting for real-world equipment performance

Learn from the industry expert and avoid costly mistakes while developing your project.

Karl Edwards,
Partner,
EXCELSIO COMMUNICATIONS, Alpharetta, USA

5:30 PM **Conference Adjourns to Day Two**

5:45 PM Exclusive Cocktail Reception

Network with industry leaders at this exclusive cocktail reception.

Day Two: Wednesday January 24th, 2007

7:30 AM **Registration and Continental Breakfast**

8.15 AM **Opening Remarks from Chairperson**

Case Studies: Harlem, New York, Philadelphia, San Francisco and Houston

8:30 AM **Feasibility Study for the Community of Harlem, NY: Necessary Tools for a Successful Feasibility Study and Business Plan Development**

Hear from the leading US management and technology consulting firm that has been involved in feasibility studies for Philadelphia, San Francisco, Houston and Harlem, NY.

- Conducting a comprehensive study
- Determining the feasibility of building a community based wireless broadband network
- Closing the digital divide

Learn how to build a business plan for your project and how to determine the feasibility of a wireless broadband network in your community.

Bailey White,
Sr. Partner,
CIVITIUM, Alpharetta, Georgia (US)

Agenda Continues (see over)

Day Two: Wednesday January 24th, 2007 *(continued)*

Case Study: City of Bologna, Italy

9:00 AM **Deploying a Highly Functional Citywide Wireless Network to Enhance Productivity, Efficiency and Lifestyle**

The historic centre of Bologna and the worlds' first university, has taken the lead by deploying a highly functional wireless network. Today it supports both fixed and mobile broadband Internet access as well as mobile VoIP yet it is also upgradeable to WiMAX. Take away these session benefits:

- Delivering a presentation on the technical deployment of the network
- Comprehensive guidance on the attributes of the Bologna network
- Presenting the business case for the city of Bologna and its university.

Dr. Giuseppe Paruolo, *Deputy Mayor* and *Bologna City Manager for Communication and ICT*, BOLOGNA (Italy)

Martyn Levy, *CEO*, ROAMAD, Auckland, (New Zealand)

9:45 AM **Sponsor Exhibit — Networking Break**

Case Study: Fredericton

10:15 AM **Wireless Network as a Component of a Municipal Infrastructure: Learn How to initiate and Manage the Project from the Experience of a Leading Innovative Community in Canada**

- Understanding political challenges and pressures from traditional communication carriers
- Learning technical and geographical limitations of the WiFi network
- Managing the network and improving its performance
- Delivering arguments for your council to build a free WiFi network

Learn from the most successful case study in Canada and build your own wireless network the right way.

Maurice Gallant, *Chief Information Officer*, FREDERICTON

Case Study: Toronto

11:00 AM **Public Private Partnership: An alternative Model for Delivering Wireless Infrastructure — Cost and benefit analysis**

A Partnership between the City of Toronto and the Toronto Hydro Telecom has been formed to leverage existing local assets—dark fibre and the street lighting system. The project was initiated to generate value for the city, its local-government workforce, residents, and businesses with a broadband-wireless infrastructure.

- Delivering the network – what you need to consider
- Choosing your partners and recognizing their assets
- Security and privacy – communicating with city departments
- Analyzing the marketing strategy, partnering opportunities and advertising

Sharyn Gravelle, *Vice-President, Wireless*, TORONTO HYDRO TELECOM

11:45 AM **Presenting the benefits of Wireless Technology**

An overview on where we are and what is possible within the Wireless Environment both within the Public and Private Sector.

William Bangert, *Senior Vice President, Technology Services and Business Development, Enterprise Group*, BELL CANADA

12:30 PM **Networking Luncheon**

This is your opportunity to make new business contacts and discuss the ideas presented in the morning session.

Case Study: City of Grand Rapids

2:00 PM **Writing a Successful Request for Proposal: Attracting the Right Partners and Vendor Teams for Your WiFi Project**

Is your RFP specific and attractive enough to ensure that citizens' best interests are served and private partners are secured? Here is a case study on how the city of Grand Rapids released its successful RFP.

- Creating a roadmap that will lead to the success of your project
- Developing an attractive RFP to avoid unexpected problems down the road.

Learn how to develop a successful RFP.

Sally Wesorick, *Wireless City Project Manager*, CITY OF GRAND RAPIDS, Michigan, USA

Debate: Health Risk Myths vs. Reality

2:30 PM **Exposure to Electric and Magnetic Fields: Assessing the Risk Associated With the Usage of WiFi Networks**

Hear this one-of-a-kind debate on the current technological developments and how safe they are to the public?

- Delivering findings of the recent studies by Health Canada, California Public Utilities Commission and Toronto Hydro Telecom
- Analyzing pros and cons of a WiFi network across the University campuses, hospitals or downtown core centers
- Canadian and American regulations on exposure to the EMFs
- Application of the precautionary principle

Discuss the health concerns regarding WiFi networks and obtain the answers you need.

Frederick Gilbert, *President*, LAKEHEAD UNIVERSITY (Thunder Bay)
Magda Havas, *Associate Professor, Environmental and Resource Sciences*, TRENT UNIVERSITY
Robert Bradley, *Director of Consumer and Clinical Radiation Protection*, HEALTH CANADA
Ronald Macfarlane, *Supervisor, Environmental Health Assessment & Policy*, TORONTO PUBLIC HEALTH

3:45 PM **Sponsor Exhibit — Networking Break**

Interact with conference speakers and fellow attendees.

Day Two: Wednesday January 24th, 2007 *(continued)*

4:00 PM **Extending the Impact of Wireless Mesh Networks in Towns & Cities**

Our expert will explore the current state of municipal Wireless Mesh Networks and see how they can be extended to include VHF radio, Video Surveillance, Satellite and Unified Communications to provide powerful benefits to a variety of Public Sector functions, including: Public Safety, Healthcare, Environmental Management and others.

- Making a significant impact on municipal governance
- Enhancing productivity
- Ensuring Constituent satisfaction

Brantz Myers,
Director of Enterprise & Industry Marketing,
CISCO SYSTEMS

Panel Case Studies: New York, Montreal, Dryden

4:45 PM **Effectively Deploying Your Wireless Network: Find solutions to Your Technical, Logistical and Economic challenges**

- Selecting the appropriate technologies and solutions to service those needs
- Guiding you through your pivotal choices on wireless applications
- Building and operating a productive wireless network infrastructure
- Dealing with technical challenges in rural areas

Dana Spiegel,
Executive Director,
NYCWIRELESS (New York)

Michael Lenczner,
Founder, ILE SANS FIL,
Montreal (Quebec)

Del Schmucker,
Information Systems Manager, KEEWATIN – PATRICIA DISTRICT SCHOOL BOARD (Dryden, Ontario)

5:30 PM **Closing Remarks**

Conference Venue: Metro Toronto Convention Centre

The conference will be held at the Metro Toronto Convention Centre (MTCC), conveniently located at 255 Front Street West. Accommodation has been arranged at the InterContinental Toronto Centre, located just east of our venue at 225 Front Street West. Strategy Institute is offering an exclusive room rate of $189 per night. Call by December 23rd, 2006 and mention Strategy Institute to receive the group room rate. Call **416-597-1400** or visit www.torontocentre.intercontinental.com for details.

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Peter Rogers, *Chief Executive,* **City Council, London, UK**

Dr. Giuseppe Paruolo, *Deputy Mayor and Bologna City Manager,* **Bologna, Italy**

Craig Settles, *Author,* **"Fighting the Good Fight for Municipal Wireless"**

Maurice Gallant, *Chief Information Officer* **Fredericton, Canada**

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initially no solutions seemed forthcoming.

"Plenty of people in the U.S. were doing municipal wireless access on a fixed basis, but no one had ever been able to do it on a moving train," Rudolph says. The most common wireless interface, 802.11b, wasn't practical because it had a range of less than 300 feet. Satellite transmitters, used on European trains, were nixed because they wouldn't work in tunnels along Caltrain's main route.

Two years ago, Caltrain officials stumbled upon a new possibility when they heard about WiMAX, which is effective over greater distances than WiFi. Caltrain worked with Intel Corp. and the result has been a seemingly workable prototype: A series of WiMAX base stations clustered around the track, each equipped to transmit data at broadband speeds over a range of up to six miles. The train's central receiver picks up the signal, then divides and redistributes it via access points in individual train cars. "The end result would be that each user on the train would have data delivery in excess of DSL speeds," Rudolph says. "We knew this was something we could do to increase our ridership."

As the test network was erected, however, planners faced a number of technical hurdles. "If the track is curved, or if there's lots of foliage around, you have to put the stations closer together," says Nigel Wallbridge, executive chairman of United Kingdom-based Nomad Digital, which designed the networking system used on the trains.

"You can't just send out a solution in a box and be done with it. You need to know the specific features of the landscape," Wallbridge says pointing out, for instance, that base stations need to be close enough together for the train's receiver to seamlessly switch from one to the next, much as square dancers switch partners without missing a beat.

The success of the Caltrain trials indicates these challenges have been sufficiently addressed to ensure a smooth full-scale rollout in the spring of 2007. Still, they acknowledge that a variety of unexpected issues may crop up as Caltrain adopts a systemwide network. "Sometimes trains can interfere with each other," Wallbridge says. "Usually, you have one train connecting with one base station. But if one base station is communicating with five or six trains, there can be a [network] traffic problem."

Inspired by Caltrain's progress and visions of their own, other public transit providers have begun hatching plans to offer wireless Internet on board, including Boston's Massachusetts Bay Transportation Authority, San Diego's Metropolitan Transit System, and the BART/Capitol Corridor system which connects San Francisco to the East Bay and Sacramento.

The projects are still in the very early planning stages; BART, for instance, is weighing the merits of several data transmission platforms, including traditional WiFi access points and bidirectional satellites as well as WiMAX base stations. "The technological field is wide open at this point," says Jim Allison, a BART public information officer. Because of the time it will take to assess all the options and complete trials, he doesn't anticipate wireless access will be available to riders until 2008 at the earliest.

One of the challenges in building public transport networks will be managing costs. "Building a system that includes 'handoff' capability is much more expensive than building a municipal WiFi system that does not support full mobility," says industry analyst Andrew Seybold, president of the mobile wireless company Outlook4Mobility. "Even when the installation is finished, there will be ongoing maintenance and back-haul costs, and probably some additional radio equipment needed to fill in gaps." He estimates the Caltrain project and others like it could go 30 percent to 40 percent over budget, a claim project insiders dispute.

So far, so good: Multiple riders were able to search the Internet, watch streaming video and complete file downloads as the train barreled along.

Despite technological and fiscal challenges, in-transit wireless will ultimately meet with success because of rider demand, according to Vince Sheetz, Intel's lead technical consultant on the Caltrain project. "Railways all over are clamoring for wireless," Sheetz said. "There have been some applications of the technology in the past that haven't worked out, but now we're at the point where we can do it well. In the next three years, it's going to be everywhere." MW

Could the future of wireless be open source?

by Joseph C. Panettieri

WHEN RESIDENTS AND VISITORS connect to wireless hotspots in Champaign-Urbana, Ill., many of them unknowingly become open source software users. Many of the region's hot spots were designed by the Champaign-Urbana Community Wireless Network (CuWiN, www.cuwireless.net/), a coalition of wireless developers and community volunteers who frequently leverage open source software and open hardware.

Through a three-year, $500,000 grant from the National Science Foundation, CUWiN and the University of Illinois, Champaign-Urbana are developing wireless mesh networks based on open source technology. This commitment to open systems provides municipalities with low-cost, community-controlled alternatives to contemporary broadband models, says David Young, a chief engineer at the organization.

Interest in open source WiFi is on the rise nationally, although municipal broadband networks based on open source remain rare. Most municipal broadband networks use commercial software and networking hardware. But advocates believe open source solutions—involving operating systems, applications, WiFi hardware and networking software—will catch on in public broadband.

"It's not only feasible, it's necessary," says Matt Westervelt, founder of Metrix Communication LLC, which designs open WiFi hardware. "Municipal IT projects that use proprietary equipment... often [don't realize] the repercussions of being locked into a single vendor

Navigating the Open Technology Market

Many open source software and hardware suppliers that specialize in WiFi networks are low-profile startups that lack national reach (see list next page). And other than Red Hat and Novell, most open source companies lack deep pockets for effective marketing and PR campaigns.

Through web searches and networking with peers, city leaders can quickly create a shortlist of open source options. At least three fledgling companies—OpenWRTm, Meraki and Metrix—specialize in open hardware for WiFi networks. There's also growing momentum for open source in the voice-over-IP (VoIP) sector, where companies such as Asterisk, Gizmo Project and Haagenti are elbowing for position.

Even with a list of open source partners, municipalities will face challenges. For starters, many IT consultants lack open source expertise and instead specialize in specific commercial networking gear. Also, open source companies themselves often lack the hands-on experience required to service and support a large municipal organization. In some cases, local Linux and WiFi user groups can help municipalities to overcome such skills shortages.—J.C.P.

solution. By bringing in open solutions, a municipality can save a lot of money not only on hardware, but also the software, design, maintenance and so forth."

That's because many open source companies charge little or no money for their software, and instead charge for ongoing service and support. The Champaign-Urbana Community Wireless Network estimates that open source WiFi networks can cut hardware and software acquisition costs by 80 percent or more.

Open source also allows a municipality to innovate locally while leveraging open source software developers worldwide. "An open source system enables and encourages local companies and individual community members to participate and increase their skills," says Robin Chase, founder and CEO of Meadow Networks, a consulting firm that focuses on wireless and transportation. "An open source system also introduces the possibility for an additional and important gain in any muni system: Local knowledge and local innovation."

Still, open source isn't for everyone. In fact, most municipalities don't even include open source options on their public broadband RFPs, says Young. That's because the open source movement is fairly new to the public broadband sector. While many enterprise and university CIOs now understand the power of open source, many municipal CIOs are otherwise occupied managing legacy systems built on Unix, Windows and aging minicomputers.

Universities, and more recently, businesses, have greatly benefited from the open source movement. More than 60 percent of corporate and academic Internet sites run Apache, a free open source Web server. And numerous open source software providers now serve the corporate market, including Red Hat Inc. and Novell Inc. (operating systems); MySQL (databases), and JasperSoft and SugarCRM (enterprise applications). Even traditional applications developers, such as Oracle Corp. and SAP AG, have adjusted their development models to support such platforms as Linux.

The federal government has also jumped aboard the open source bandwagon. A recent government report urged the Department of Defense to embrace open source and open standards. The report also pointed out that utilizing open source technology will "force the commercial software industry to respond with greater agility and competitiveness." Vendors have responded swiftly to growing government demand for open source solutions. One prime example: Dell Inc., Oracle and Red Hat have partnered to engage government organizations with Linux-based software suites.

Proponents insist that municipalities—just like the federal government and corporate enterprises—can benefit greatly from open source. But even the staunchest proponents concede that the market for open source WiFi networks is in its infancy.

"We're on the very, very, very beginning of the adoption curve," says Sascha Meinrath, executive director of the Champaign-Urbana Community Wireless Network. "It's likely that the U.S. will also be pretty slow on the uptake compared with other countries. The U.S. market is so completely saturated with fear, uncertainty and doubt about open technology that decision-makers are scared away from it. I think people forget that the Internet itself is built around open technologies."

In the long run, Meinrath believes, a large number of cities and towns are going to be "kicking themselves" for going with a proprietary wireless solution. "It amazes me that more municipalities are not requiring open technology as a part of their RFP process," he laments. "It's very short-sighted."

For open source to truly catch on in the municipal wireless sector, thousands of additional trained experts will need to enter the market. But betting against the open source movement would be foolish. After all, nearly 40 percent of new corporate servers run Linux. And progressive Web companies—from Google to Yahoo—have standardized on open source databases. Concludes Chase: "If you read the tea leaves, open source seems inevitable on municipal wireless networks." MW

Open Source Resources for Munis

The list below provides organizations that offer open source options in the public WiFi sector:

ORGANIZATION	WEB	SPECIALTY
Ubuntu	ubuntulinux.org	Thin-client Linux
Zoip	zoip.ca	Thin-client Linux
WiFiDog	wifidog.org	Portals
OpenWR	openwrt.org	Open hardware
Meraki	meraki.net	Open hardware
Metrix	metrix.net	Open hardware
Asterisk	asterisk.org	VoIP
Haagenti	haagenti.com	VoIP
Gizmo Project	gizmoproject.com	VoIP

WiFi moves off campus

Universities share their smarts with city leaders

by Joseph C. Panettieri

IT DOESN'T TAKE A ROCKET SCIENTIST TO DEPLOY WIFI, but a few university professors can certainly ease the rollout of such networks. Indeed, many municipalities are leveraging university talent to set up public WiFi systems. The so-called "Muni-Uni" connection has taken hold in Cambridge, Mass. (backed by MIT); Tempe, Ariz. (Arizona State University); and Winston-Salem, N.C. (multiple colleges), to name a few.

The connection between universities and municipalities is hardly surprising. Universities have a long history of giving back to their communities. And, unlike many corporate enterprises, universities were among the earliest adopters of WiFi networks. Most colleges have offered departmental wireless access since the mid-1990s. In 2000, Drexel University became the nation's first major college to offer wireless Internet access across its entire campus. Today, nearly every U.S. college and university offers some form of wireless Internet access, according to *Campus Technology* magazine.

Much of that academic WiFi expertise is spilling over into municipalities. In Cambridge, for instance, MIT professors and IT managers are gradually extending free broadband access to low-income neighborhoods that typically can't afford or don't have access to commercial broadband services. "It's a completely ad-hoc relationship between Cambridge and MIT," says Kurt L. Keville, a research specialist at MIT. "MIT and Cambridge have a fairly long history of combining outreach programs."

The Cambridge network uses off-the-shelf WiFi equipment that MIT researchers have customized for outdoor public broadband use. The system is still in its very early testing stage, with underprivileged areas such as Newtowne Court coming online first. A broader beta test is anticipated for the summer of 2007, Keville says.

One of the challenges is ensuring broadband access reaches apartments that are deep within buildings. "Some apartments are buried in buildings and don't have window access," explains Keville. "And that's where we have to do some work" ensuring WiFi signals are strong enough to reach those areas.

Ultimately, MIT and Cambridge expect students to move seamlessly between the university and city networks. MIT students take broadband wireless service for granted: The university's campus has 3,000 wireless access points. As the Cambridge network moves from testing to the production stage in late 2007, students will be able to "take a piece of MIT with them and work on courseware while they're off campus," says Keville.

The situation is similar in Winston-Salem, where a non-profit public broadband organization called WinstonNet Inc. leverages talent from Wake Forest University, Forsyth Technical Community College and local businesses. WinstonNet released a draft RFP for a city- or countywide wireless broadband network in May. The RFP, which carried a July 7 deadline, requires at least citywide WiFi coverage (109 square miles), but WinstonNet prefers solutions that cover all of the broader Forsyth County (402 square miles).

Wake Forest's participation in the WinstonNet project

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bodes well for local students, residents and businesses. The university has pioneered numerous wireless applications since launching a campus mobility research program in 2005. That effort, known as MobileU, allows students, staff and faculty to test smart phones featuring cellular and WiFi capabilities, according to Jay Dominick, CIO and assistant VP of information systems at Wake Forest.

"Students ultimately want to carry a single communications device," says Dominick. "In the years ahead, we expect that device to be a single smart phone, regardless of whether the student is on campus or off campus." Wake Forest has developed numerous WiFi applications for the smart phones. For instance, students receive automated alerts when their laundry is done washing or drying. Wake Forest is evaluating whether to open up the system to advertising from local restaurants and businesses.

Dominick believes universities and municipalities will need to work closely together in order for public broadband to reach its full potential. For example, many smart phones can place phone calls over WiFi networks, but the quality of such calls varies greatly. "Students can get Skype client [software] for the smart phones," Dominick says. "This will let them place calls on the WiFi network but the quality isn't there yet. The service doesn't roam real well as you move between [WiFi] access points."

The City of Tempe has also maintained a close working relationship between its public WiFi network and the Arizona State University system. The wireless network, which covers all of Tempe (40 square miles), has a paid user subscription model. However, access to City of Tempe services downtown merchant services and ASU services is available for free.

Tempe had several major goals for the network, according to Deputy CIO David Heck. In addition to providing an alternative to DSL and cable modem services, the city wanted to provide total mobility to municipal employees, students and knowledge workers, Heck says.

ASU and Tempe worked together on a "proof of concept" for the network from April to July 2004. The pilot involved 15 access points placed on buildings and was offered free to anyone in the coverage area courtesy of ASU. Based on that early experience, the city developed an RFP and in early 2005 selected MobilePro to develop and run the system. The WiFi network was completed in February 2006.

"Through WiFi we've made the Tempe community smaller and closer knit, and we've extended the ASU campus to more visitors," says Heck. "Free access to Tempe.gov puts the mayor in our residents' living rooms. And free access to ASU.edu makes the campus larger and readily accessible to everyone in the area."

The Muni-Uni trend is showing no signs of a slowdown. Just ask residents in Houston, where Rice University assisted a project know as Technology for All-Wireless. The TFA-Wireless project meets performance objectives (pervasive Internet access at 1 Mbps and above) and economic objectives (sustainable WiFi operational costs for low-income demographics), according to Rice Professor Edward W. Knightly.

The initial service area covers approximately two square miles in Houston's East End, with additional coverage to come online over the next few months. Local residents with a Houston Public Library Power Card who attend an orientation class can qualify to receive free or reduced-rate Internet services from TFA-Wireless, Knightly notes.

Residents who don't have computers can access the system through wireless PCs available at Houston's Melcher Branch library. MW

TOP 20 WIRED COLLEGES

RANK	UNIVERSITY	CITY, STATE
1	*Ball State University*	Muncie, IN
2	*Western Michigan University*	Kalamazoo, MI
3	*University of Akron*	Akron, OH
4	*Dartmouth College*	Hanover, NH
5	*Carnegie Mellon University*	Pittsburgh, PA
6	*Bridgewater State College*	Bridgewater, MA
7	*St. John's University*	Queens, NY
8	*Case Western Reserve University*	Cleveland, OH
9	*Bryant University*	Smithfield, RI
10	*Trinity University*	San Antonio, TX
11	*Sacred Heart University*	Fairfield, CT
12	*California State University, Monterey Bay*	Seaside, CA
13	*United States Military Academy*	West Point, NY
14	*Purdue University*	West Lafayette, IN
15	*Drexel University*	Philadelphia, PA
16	*University of Dayton*	Dayton, OH
17	*Oklahoma Christian University*	Oklahoma, City OK
18	*Northern Michigan University*	Marquette, MI
19	*Coppin State University*	Baltimore, MD
20	*University of Minnesota*	Minneapolis, MN

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Kurt Lange, US Internet co-founder and vice president of systems and customer service.

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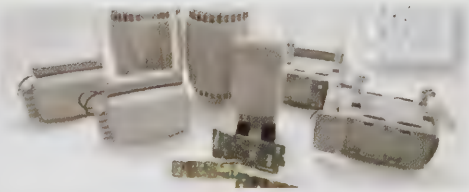

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The future is in your hands.

The proliferation of ubiquitous, high-speed digital connectivity has the potential to change the world. In the past decade we've already seen how the Internet has dramatically altered the way we live, work, play and interact. This is merely the beginning.

Today's conglomeration of individuals, cities, communities and companies that are driving municipal wireless deployments are among the pioneers who are making this new era a reality. Being a pioneer comes with risks and rewards and, ultimately, grave responsibilities. The decisions you make today could have long-lasting effects not just on your communities, but on the ability of broadband to be implemented ubiquitously around the world.

With that in mind, we've asked four thought leaders in the broadband community to write essays addressing topics that strike at the core of what we are calling The Broadband Agenda. We asked them to address not just the realities of municipal wireless, but also the responsibilities and opportunities. As an added bonus, we also asked Andy Abramson to take a look at some of the interesting devices that are enabling and taking advantage of always-on, always-available broadband.

We hope you find the following reports illuminating and thought-provoking. If you'd like to weigh in with your own vision for The Broadband Agenda, or if you'd like to respond to any of these articles, please send your thoughts to al@muniwireless.com.

—Al Perlman, Publisher

digital inclusion.

Social justice in a communications age

by Sascha Meinrath

When do we recognize a shift in the fundamental social fabric of civilization? Where do we look to find better exemplars of participatory democracy? When do we realize that notions of justice have to expand to include new ways of thinking about human rights? How do we change our institutions to support a more just and equitable world?

These are questions that thought leaders in the community and municipal wireless movement have been asking more and more over the past few years. In a communications age, access to resources, information, opportunities and conversations is vital—the foundation upon which the future of civil society rests.

We often think far too small when we talk about wireless networking, particularly with a concept as broad and far-reaching as digital inclusion. The debate usually comes down to the very real tension between market economics and the "social contract" companies should be held to when providing critical resources to local communities. And, too often, market realities win out.

The challenge is to change the very nature of this debate and to focus on building telecommunications infrastructures that directly improve the lives of users. "Digital inclusion is a basic right of all Americans," says Jim Baller, Senior Principal of the Baller Herbst Law Group.

"In the years and decades ahead, virtually everything that we do at work, in education, in public safety and homeland security, in medical care, in entertainment, in our communities, at the polls, etc., will depend increasingly on affordable access to advanced communications services and capabilities," Baller adds. No nation can lay claim to greatness without acting vigorously to ensure that none of its residents will be left out of the world." >>

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What are the social and economic benefits of digital inclusion?

The importance of broadband services to communities is growing dramatically. "It is beyond dispute that information and communications technologies bring advantages in education, job training, social networking, healthcare and overall quality of life," says Ben Scott, policy director for Free Press. However, access to the Internet is only one component of digital inclusion. As Scott says, "Having the 'ICT trifecta' —access to the Internet, the equipment to use it and the skills to exploit it—may well be the difference for many families between upward social mobility and a declining standard of living. For children especially, having access to technology is not a luxury, it is a social necessity."

When Alexis de Tocqueville wrote "Democracy in America" in 1835, he praised the Postal Service and the newspapers and other information it conveyed as greatly responsible for America's successes and the education of its populace. Jim Snider, Senior Research Fellow at the New America Foundation, parallels this analysis: "Democracy requires well educated citizens. The Internet has become a necessary foundation for a well-educated, economically productive citizenry for the 21st century." John Atkinson, Director of Wireless Ghana, concurs: "Communication and information give people hope and inspiration." And Dr. Arun Mehta, President of the Society for Telecommunications Empowerment in India, underscores the stakes for civil society: "You cannot have democratic processes that exclude a significant percentage of citizens."

Many wireless pioneers advocate looking at digital inclusion as a vaccine that enhances civil society and protects against disruption. Says Harold Feld, Senior Vice President of the Media Access Project: "Leaving aside any considerations of social justice, creating permanently marginalized and technologically isolated pockets spread throughout our rural and urban areas is recipe for disaster."

And yet, contemporary broadband indicators show that the United States has done a terrible job of connecting its citizenry over the past half-decade. "For the last six years, the Administration has defined America's best interests as synonymous with those of a handful of giant telephone and cable companies," says Baller. "During this period, trillions of dollars of investment capital have evaporated, America has plunged from 4th to 16th (some would say 19th) in global broadband penetration, and we have fallen increasingly behind the leading nations in access to high-bandwidth capacity and in cost per unit of bandwidth."

If civic participation is a central tenet of democratic society, then we need to think about Internet access and technological savvy as equally important. Matthew Rantanen, Director of Southern California Tribal Technologies, has seen the impact of community-owned broadband services and technological training on Indian reservations he has worked with. "The people of the community have a better sense of control of their own destiny," he says. "They feel that by their own hand, they have taken control."

"Digital inclusion is not about averting social catastrophe, or *noblesse oblige* to the underprivileged, or charity," says Feld. "It is a calculated investment to promote our national self-interest, as sensible as any Silicon Valley VC investing in a start-up."

What can we do to address digital inclusion?

Many telecommunications scholars view the first decade of the 21st Century as a critical juncture in communications history: An era where a confluence of national and global events, social movements and political thinking are combining with scientific advances to create exciting shifts in civil society.

Certain tools are widely held to be highly supportive of digital inclusion efforts: More unlicensed spectrum; low-cost hardware, and education initiatives for the general public and local, state and national policy makers. Greg Richardson, Managing Partner for Civitium, recommends a shift in federal private-sector, subsidy-based funding to "programs that are aligned with community broadband initiatives." According to Richardson, this realignment would "stimulate public-private cooperation at a local level, specifically encouraging corporate social responsibility."

Broadband access is only one facet of a successful digital inclusion initiative. Angela Stuber, Executive Director of Grassroots.org, says we need to expand thinking about digital inclusion to encompass not only geographic, class and racial disparities, but also the current discrimination against constituents with motor skill, sight, hearing and other disabilities.

Far too often, however, key decision-makers have come across as out of touch with the needs of their constituents. Says Laird Brown, one of the organizers for the upcoming AirJaldi Community Wireless Summit in Dharamsala, India: "Sometimes people get hung up on their own preferences and lose sight of end users."

Becca Vargo Daggett, Director of the Telecommunications as Commons Project of the Institute for Local Self-Reliance, points

out the need to shift basic assumptions about broadband service provision, "I want people to change the way they think about communications technologies." Daggett advises that a wider range of business plans be considered: "That might mean charging most users $15 or $20 per month. It might mean treating Internet access like the public libraries—a free amenity for everyone; or public transportation—a very low-cost service for everyone."

What do decision-makers often overlook?

Unfortunately, some business models have faced a substantial backlash from incumbent ISPs. Annie Collins, Founder and Chairwoman of Fiber for our Future, cautions communities to be vigilant against "anti-muni propaganda" from these corporations. "I believe local policy makers most often overlook the flack they will receive from the telcos and the cablecos for trying to take charge of their digital destiny."

Seeking community input and local expertise at an early stage is particularly important to ensuring the success of the initiative. Yet many municipal decision-makers have been loath to shift power to the communities the networks serve, even though, as Feld points out, "studies consistently show that community broadband deployments are most successful when they are championed by a leader within the community."

"I worry that the balance of financial obligations, city contracts and public pressure seem to create a caustic environment for anything more than superficial community engagement in a developing wireless network," says Hannah Sassaman, Program Director for the Prometheus Radio Project. "Decision-makers need to allow their network to be not just be shaped by, but truly owned by, the communities who need to use it."

According to Sassaman, "The watchword should be local determination of local communications policies." Education, outreach and relevance are also vital. As Richard MacKinnon, President of Austin Wireless, points out, while "systemic exclusion must be addressed, we must also recognize that many people choose not to be included because they do not recognize the benefits nor do they have an immediate need for an electronic solution to their problems."

It may seem obvious that nobody benefits from digital exclusion: Yet, in our society broadband services remain inequitably distributed. "A third of the country has no Internet access of any kind, and another third is stuck with dial-up," says Scott. "The market is an imperfect mechanism for delivering essential communications services. Moreover, there is little incentive above the bottom line to spend resources on technology training, equipment distribution and digital inclusion."

Baller points to market forces as part of the problem: "A profit-maximizing firm has a fiduciary duty to serve the most lucrative possible markets first, and that will inevitably result in some degree of exclusion." And, as Brown points out, "rural areas have two things going against them—they're remote and they are thinly populated. It all

Find out more about innovative digital inclusion projects and organizations:

Association for Community Networking: www.afcn.org

Boston Wireless Task Force: www.cityofboston.gov/wireless

Center for Neighborhood Technology: www.cnt.org

Civitium: www.civitium.com

CUWiN: www.cuwireless.net

Digital Access Project: www.digitalaccess.org

Ethos Group: www.ethoswireless.com

Free Press: www.freepress.net

Lafayette: www.lafayetteprofiber.com

Lily Pad Project: www.lilypadusa.org

Media Access Project: www.mediaaccess.org

Media Alliance: www.media-alliance.org

Minneapolis: www.ci.minneapolis.mn.us/wirelessminneapolis

Prometheus Radio Project: www.prometheusradio.org

TIER Research Group: http://tier.cs.berkeley.edu/wiki/Home

Tribal Digital Village: www.sctdv.net

Urban Dreams: www.urbandreams.org

Wireless Ghana: www.wirelessghana.com

Wireless Harlem: www.wirelessharlem.org

Wireless Philadelphia: www.wirelessphiladelphia.org

Sascha Meinrath is an editor for MuniWireless.com and the Founder and Executive Director of CUWiN .net. Sascha serves on the Board of Directors for CTCnet, a U.S.-based network of more than 1,000 organizations united in their commitment to improve the educational, economic, cultural and political life of their communities through technology. In 2006, Sascha founded EthosWireless .com, a wireless consultancy focused on social justice.

boils down to distance and dollars." Rantanen has seen this problem first-hand: "Even with such programs as Universal Service, there are still voids in service with POTS [plain old telephone service] connections to the Indian Reservations in the country. Simple lifeline service is still unavailable to residents."

Yet the same corporations that choose short-term profit maximization suffer from exclusionary practices over the long-term, says Catherine Settanni, Founder and Executive Director of the Digital Access Project: "Telecommunications companies that set prices for maximum profit and redline poorer neighborhoods might think they are benefiting, but what they are really doing is reducing their chances of expanding their own future markets."

Who is doing innovative digital inclusion work?

The list of innovative and exemplary digital inclusion projects and organizations crisscrosses the country: Boston; the Center for Neighborhood Technology (Chicago); CUWiN (Urbana, Ill.); Lafayette (La.); Lily Pad Project (Cincinnati); Media Alliance (Oakland); Minneapolis; Prometheus Radio Project (Philadelphia); Tribal Digital Village (San Diego); Urban Dreams (Des Moines, Iowa); Wireless Harlem; Wireless Philadelphia and many, many others.

One of the hallmarks of most of these endeavors is that they have filled in and taken over where the "free market" has failed local communities. "Private partners should not be relied on as the sole source of funding and programs for digital inclusion," says Richardson of Civitium. "Local government should also commit funds and resources."

"For meaningful digital inclusion to occur, the goal of the network should be universal, affordable access for all members of a community," say Scott. "To reach this goal means more than just building a network infrastructure; it means equipment distribution, technology training and social services."

Settanni recommends that all digital inclusion initiatives create a Community Technology Agenda and points to the City of Minneapolis's Digital Inclusion work as one exemplar. The Minneapolis plan was created to ensure that:

1. Everyone is connected and informed
2. Transparent, secure systems protect everyone's privacy
3. Technology literacy training is available for all
4. A 'get online' campaign is conducted
5. The initiative builds economic development through digital access
6. Digital access for civic engagement and accessible government is central
7. Local content for engagement and information is created

Digital communications is the uber-medium—it encompasses print, audio, telephony, radio, video, photography, etc. along with Web surfing, social networking, e-mail and countless other uses. "Communications and technology are infused into every aspect of our society," says Michael Maranda, President of the Association for Community Networking. "Any tech plan involving a vendor has to have a meaningful, substantive return to the community."

"Our policies should facilitate community broadband networks that focus on public service priorities. We should build and open public network infrastructure to ensure the information superhighway is open to all users," states Scott. Accordingly, Scott recommends that "we should maintain network neutrality. We should open the public airwaves to unlicensed, public applications in wireless broadband. And we should integrate digital inclusion programs."

"All too often we separate the economic development potential of investing in broadband without thinking about the concomitant need of investment in human and social capital," Maranda concludes. At this critical juncture in the development of a global digital civilization, the stakes have never been higher or the possibilities grander. MW

Policy Drives MuniWireless in Europe

BY PIERS BEARNE, EDITORIAL DIRECTOR, ROCK MEDIA

There's a big risk for the municipal wireless market: Vendors are pushing technologies, cities want solutions. So, when preparing for our Wireless Cities Congress, we did something a little radical and asked the community (the policy-makers, the heads of departments, the CIOs) what they actually wanted. Perhaps unsurprisingly, their first answer wasn't "wireless hotzones."

Far from it.

Cities have their own problems. A recent survey of cities around the world identified four shared goals for improvement: infrastructure and transportation; the economy; planning, and crime. Not free broadband access or mesh networks.

Of course, cities do see wireless and other digital technologies as potential enablers of economic growth and social inclusion as well as other services for citizens and employees. But it's not important unless it's used with devices and applications that deliver on policy objectives. That's why it's so important to promote stories like the use of mesh in conjunction with police data networks to reduce crime in Ripon, Calif.; or the use of wireless LBS to provide passenger information and employee mobility in the Paris public transportation network.

In the global city survey, the improvement objective that came fifth for city leaders was funding and finances. How can cities deliver services more efficiently without incurring huge capital costs? How can employees be mobilised and made more productive? Here, muniwireless has a big play to make. Wireless is cheap. It is a standardised, interoperable, neutral bearer for all kinds of advanced enterprise applications, and it does support a whole host of interesting devices like dual mode phones, RFID and RTLS clients.

We've come across some radically different policy agendas in our research for Wireless Cities. Westminster has a highly pragmatic, business-like approach to city management: How can we deliver good value services to our citizens? Paris has a top-down, social model: How can we enable our citizens with a large-scale infrastructure project? The new Europe, exemplified by Gdansk, Poland and Tallinn, Estonia, is more concerned with eDemocracy and transparency of government. Spain's Barcelona and Italy's Siena are focused on creating the knowledge society, creating economic growth through lifelong education. Most excitingly, the city of Dongtan in China is becoming the world's first eco-city, addressing the biggest challenge facing us all in the 21st century. These cities are all presenting their experiences at Wireless Cities in Cannes.

PIERS BEARNE IS FOUNDER AND EDITORIAL DIRECTOR WITH ROCK MEDIA, ORGANISERS OF **THE WIRELESS CITIES CONGRESS IN CANNES (NOVEMBER 29 – DECEMBER 1, CANNES, FRANCE).** MUNIWIRELESS IS THE OFFICIAL MEDIA PARTNER OF THE CONGRESS. FIND OUT MORE AT WWW.WIRELESSCITIESCONGRESS.EU.

Making the case for public ownership.

by Becca Vargo Daggett

When the Wireless Philadelphia Executive Committee released its report in December 2004, the idea of using citywide wireless to bridge the digital divide captured the national imagination. Less attention was paid to the conclusion that non-profit ownership would best serve the city's goals for the network.

Thus, when Philadelphia deviated from its business plan in favor of a privately owned network in October 2005, it went almost unnoticed. A year later, fully half of all pending citywide wireless projects are variations on the so-called Philadelphia model, in which the city is an anchor tenant for a privately owned network.

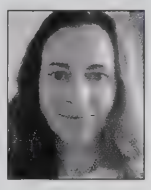
About 80 percent of operational networks, however, are publicly owned. Of the 56 citywide or countywide wireless public access networks listed in the June 2006 MuniWireless report, 39 are owned by a municipality or cooperative. An additional 35 municipally owned networks are reserved for municipal use only.

The rapid rise of the Philadelphia model in the face of so many successful publicly owned networks seems to be driven by a knee-jerk negative reaction to the idea of public ownership. Elected officials have been told that owning the network is a waste of public resources, that cities are not competent to understand the technology and that municipal wireless is just government intrusion into a competitive market.

However, the evidence from existing municipal wireless networks contradicts these arguments against public ownership, and demonstrates that public broadband infrastructure provides benefits not possible through private networks.

In many cities the decision about ownership is not made deliberately. Instead, elected officials look at their budget and conclude they cannot invest in an information network. The fallacy here is in equating information networks with typical non-revenue-generating capital investments, such as roads and sidewalks. Publicly owned broadband infrastructure is different because it has the potential to lower the city's annual operating budget and generate enough revenue to be self-supporting.

For example, the wireless network in Everett, Wash. (population 96,000) allows the city to do more with less. It effectively increased the number of police patrol hours by almost 20 percent, for substantially less than it would have cost to increase the force size by the same amount (more than 30 officers). Officers can check alerts, file reports and search criminal databases from the field, eliminating at least half of the drive time that previ-



Becca Vargo Daggett is the Director of the Telecommunications as Commons Project of the Institute for Local Self-Reliance, a 32-year-old organization that works with citizen groups, governments and private businesses to develop policies that extract the maximum value from local resources.

ously ate up 34 percent of their shifts.

The fiber-optic network in Saint Louis Park, Minn. (population 65,000) will pay for itself in five years through avoided costs for leased lines. It also provides the city with a platform for wireless. The city is working with a private service provider to add competition to a market in which 70 percent of households have access to only one broadband provider.

Some cities see foundation and corporate grants as an alternative for raising capital. For example, Boston envisions a non-profit raising $20 million in grants and donated equipment. The network could then be self-sustaining without revenue from municipal uses. On the other hand, financing the Boston investment with revenue bonds would add about $2.7 million in annual costs for 10 years, not much more than Corpus Christi, Texas, a much smaller city, expects to spend annually on services from a publicly financed network.

In Adel, Ga. (population 7,500) the wireless network has been operating since 2003 and has been expanded to serve communities throughout the county's 300 square miles. Adel city manager Jerry Permenter wasn't worried about competence. "Since our city has successfully owned and operated its own electrical distribution system, its natural gas system, water and sewer system for many years, the citizens felt that a city-owned system was a natural fit for us. It would be operated efficiently, and the people themselves would know who their owners were. It would be them."

All cities own physical infrastructure, from roads and sidewalks to sewers and street lights. Some 2,000 own electric utilities. Analyses indicate that the public sector is at least as good at managing infrastructure as the private sector. For example, the Department of Energy consistently reports lower management and operating expenses for municipal electric utilities than for their investor-owned counterparts.

Buffalo, Minn. (population 13,000) operates separate municipal and public-access wireless networks, as well as a fiber-optic network serving businesses and public sector entities. Like most cities, Buffalo began offering services because the private sector would not. The phone company now offers DSL, but the municipal network continues to operate in the black and regularly expands its service areas.

In the Philadelphia model for citywide wireless, the company that owns the network is an ISP and also sets wholesale rates and terms for competing ISPs. The network owner can limit competition by creating artificially high barriers to entry, just as has been the case with cable and DSL networks.

By contrast, publicly owned, open-access infrastructure facilitates a level of entrepreneurial competition only possible when service providers of all types have equal access to the network.

In Benton County, Wash. (population 150,000), the Public Utility District provides wholesale access to wireless service providers. Residents of the rural county can choose from five residential and eight business ISPs, all of which are Washington-based, in addition to the incumbent cable and telephone companies. The PUD is so committed to a level playing field that its Web site automatically rotates the order in which the retail providers are listed.

Competition and access for innovative entrepreneurs, particularly local start-ups, motivated the Boston Wireless Task Force to recommend a non-profit-owned, wholesale-only wireless network. In doing so, they restated the original conclusion of their counterparts in Philadelphia: The goals of private companies often conflict with communities' goals for these new networks.

It is often said that the experience of communities like Adel and Buffalo can't be generalized. But 85 percent of municipal governments serve populations of less than 10,000. Communities of all sizes have a once-in-a-lifetime opportunity to shape their information and communication futures. Before making a decision about ownership, they should compare the evidence from successful existing networks to the claims of untested models. MW

Enabling the internet of things.

Why you should think now about future-proofing your muniwireless network

by Anthony Townsend

Municipal wireless networks are popping up almost too fast to track. In North America, Europe, Asia and Australia, local communities see the benefits of introducing a third pipe for broadband into homes and businesses. More importantly, they are also beginning to understand and exploit the new functionality of what the U.S. military calls "untethered communications"—mobile, wireless, high-speed connectivity. Visions of citizens, city employees and law enforcement agencies making use of municipal wireless networks from laptops and PDAs are powerful selling points for vendors.

But, unfortunately, it's a very inaccurate picture of how these networks are likely to be used 10, or even 5 years from now. Look at some of the world's most successful public wireless hotspots like Bryant Park in Manhattan, and you'll find perhaps 20 people at any one time working wirelessly on a laptop. After three years of word of mouth and countless media coverage, surfing the Web from a laptop in the park is still a just a small niche "application" for the park.

At the same time, in the same place, you'll see hundreds of people talking on cell phones. What this tells me is that over the next five years, as the tremendous potential of VoIP intersects with WiFi and the broad appeal of mobile telephony, we'll see a sweeping transition—almost overnight—of the usage model for public WiFi hotpots.

But, just as wireless VoIP begins to grab hold at the grass roots, another less visible but decidedly more important new set of users will start seeking access to public wireless networks. These new users aren't actually people: They're things.

"Blogjects," as interactive artist Julian Bleecker of the University of Southern California has dubbed them, are everyday things that upload data to the Internet on an ongoing basis. Today it costs less than $15 to add WiFi capabilities to just about any device, and emerging WLAN standards like ZigBee will drive the price and power demands of wireless connectivity down even further.

An outgrowth of falling costs and power requirements for wireless connectivity is that increasingly people will experiment with connecting just about anything to the Internet. The best current example of the "Internet of Things" is commercial airliners, which constantly report their location, airspeed and altitude.

Once logged to the Web, anyone can build applications around this publicly accessible and searchable data. So far, we have also seen bicycles, digital cameras, parking meters, robotic plants and even pigeons rigged with air pollution sensors connected to the wireless Internet. Over the next 5 to 10 years, anything and everything we manufacture in some way will benefit from Internet connectivity.

So why should municipal telecom planners worry about the Internet of Things? I see three clear reasons:

1 We are designing tomorrow's networks for yesterday's applications. For the most part, municipal wireless networks are being sold to citizens and designed by vendors around yesterday's usage model—stationary, individual computers connecting from homes, businesses or public spaces. But the Internet of Things (and wireless VoIP) will present very different challenges such as handoffs between base stations, dramatically different bandwidth loading profiles and the lack of interactive access control. If your network requires users to log in from a captive portal Web page, how will users get connected from a phone or a bicycle?

2 The Internet of Things is the killer app for municipal operations and public safety. Beyond the obvious and familiar examples such as wireless parking meters and vehicle tracking, the Internet of Things will enable broad deployment of a sensory Web that can transform the way cities are managed. Just as amateur scientists collect and share weather observations with the National Oceanic and Atmospheric Administration (NOAA) over the Internet, cities could employ citizen volunteers to help keep track of traffic speed, power grids and potholes. In a crisis, emergency managers could tap the local Internet of Things to get real-time data about a variety of local assets.

3 The Internet of Things will create new economic opportunities. Broadband communications has been a great economic benefactor for cities—it allows small firms to market and deliver services and information to a global market, while e-commerce creates new efficiencies in business. The Internet of Things will be a basic infrastructure for tomorrow's communities and by moving early, cities can give local entrepreneurs the opportunity to experiment and innovate new products, services and usage models that will mean new job creation. This is why I have urged leaders in San Francisco, Seoul, New York and elsewhere to pursue a policy that favors an open, wireless, thing-friendly Internet.

There are some specific things that cities can do to enable the Internet of Things as they work with vendors and citizens to plan and implement municipal wireless projects:

1 Expand your vision beyond today's killer apps. In reality, most early reports suggest that today's uses of muniwireless networks are anything but killer. A very limited set of people want to surf the Web from a laptop in the park. But all users will want to track their bicycle if it is stolen, or be able to e-mail photos to their loved ones directly from their camera. Expand your vision and your constituents will rally behind your project.

2 Work with carriers to establish basic, browser-less levels of connectivity. Captive portals are a great way to brand hotspots with local community content and identity. But they present an insurmountable obstacle to access for anything without a large screen.

3 Establish sound policies on access and security. The biggest fear about the Internet of Things is that terrorists or criminals could exploit it to further their goals. But we don't restrict access to basic public infrastructure for connectivity, such as the mobile phone network or sidewalks. Be sensible and balance the risks of open access with the enormous economic and social benefits.

In conclusion, in the excitement of today's municipal wireless frenzy, don't forget that much of what's out there is being designed for laptops—but tomorrow's uses will be anything but. Future-proof your network and unleash the Internet of Things. MW

Anthony Townsend is Research Director in the Technology Horizons Program of the Institute for the Future, an independent research organization based in Silicon Valley. He was a co-founder of NYCwireless, a pioneer in the community wireless movement. He has served as a consultant to the City of New York and State of New York on telecommunications infrastructure policy.

the new city.

Why broadband is a necessary —and wise—investment by Dianah Neff

For centuries cities have been the early adopters of new technology and by investing in new technologies, cities have become the great creative engines of commerce, culture and society. It was railroads in the 19th century and roadways in the 20th century.

After two centuries of mastering the ability to transport people and goods, leading communities now have the ability to transport information and ideas, and technology will be the infrastructure that enables them to do so. For the 21st century that technology will surely be the Internet and the electronic connectivity that it delivers.

Communities already exploit wireless technology: There are wireless hotspots at hotels, coffee houses, bookstores and public places. At commercially provided hotspots, users may need an account or they pay a daily-user fee. Other hotspots provide free access provided by cities, business districts or, in some cases, individual businesses.

However, while wireless access continues to grow, a patchwork of individual hotspots does not provide the benefits of uniform coverage throughout a city. A comprehensive and universal wireless access strategy is necessary to reap the benefits of wireless broadband, and this is where a city government can play the traditional role in providing the framework and initial investment.

The benefits of making this transformative investment are broad and far-reaching: Providing a competitive location for businesses, building a world-class center for education, attracting visitors. Citywide broadband is critical in supporting the delivery of public services. It is an essential element of a long-term strategy to invest in the human capital of the city: Its workers, its residents, and perhaps most important, its children.

Delivering Public Services

Governments are judged on how well they deliver services to their constituents and their ability to provide those services at a low cost. For the past few years many local governments have used information technology and the Internet to transform how government business is done, how services are delivered and how the public sector interacts with residents, businesses and visitors.

Many cities are aggressively pursuing initiatives to improve service delivery and reduce costs. A robust broadband infrastructure throughout the city can empower service delivery in ways that have only begun to be explored. Today cities such as Corpus Christi, Texas, justified implementing a wireless broadband network by replacing a manual meter reading service process. Philadelphia can save one to two million dollars a year by replacing 300 leased telecommunications lines with wireless technology.

Other cities are using wireless broadband for building inspection, reducing the need for inspectors to have to return to an office for assignments or documents. It's been estimated that two hours per inspector per day can be saved by having high-speed data access in the field.

Dianah L. Neff joined Civitium recently as a Senior Partner where she will lead the firm's international, municipal broadband consulting practice. She previously served in government for 20 years as the CIO for City and County of Philadelphia, City of San Diego, City of Bellevue WA, County of San Bernardino, CA and City of Palo Alto, CA.

Business continuity and preparedness are other areas where cities are looking at wireless access to improve service. For example, in the event of a water main break, engineers can access drawings and geographic information at the site in real time to make critical decisions. Public safety personnel can have information such as fingerprints, mug shots and hazardous material information, when and where they need it. In the future, intelligent clothing will track the location of a first responder in an emergency situation. During a disaster, wireless networks can be quickly deployed to allow communication to occur and overcome non-compatibility of different devices.

There are many other areas cities are beginning to explore: Health inspectors accessing restaurant records while reviewing conditions on-site; doctors tracking diabetic or heart patients in real time, anywhere in the city; property assessors having market information as they assess real estate; social workers having direct access to multiple systems while working with clients at home; probation officers tracking low-risk inmates with bracelets; paramedics communicating vital signs with emergency personnel while transporting patients.

Investing in People

A community broadband initiative can be a strategic investment in the people of a city, providing the infrastructure to bridge the digital divide. This divide limits educational and job opportunities and participation in many dimensions of modern society. Eventually it results in segments of the population forever lagging behind their peers. The potential of citywide wireless access to reinforce educational programs from elementary school through college may be the greatest long-term potential benefit to the collective health of a city.

Investing in Business

Firms and organizations evaluate many factors when deciding where to locate and do business. A city must offer a competitive, low-cost environment for firms. Wireless connectivity can be as important in the future as traditional utilities have been in the past. Providing an environment that attracts and keeps knowledge workers is all-important.

Enhancing a Visitor's Experience

Wireless access is becoming an indispensable tool of the leisure or business visitor. Today's visitors are demanding 24/7 access to travel information and are using mobile devices to book flights, reserve rental cars and make travel arrangements that only a few years ago had to be done by phone or in person. Visitors expect to look up maps and get directions, find stores and read restaurant reviews while they wander the city and visit attractions. Citywide wireless access can be an essential component of a successful strategy to grow tourism and hospitality: The benefits are increases in local employment and city revenue.

Moving Forward

Cities across the U.S. and the world are engaging in efforts to study the issues, plan for appropriate business models, review technology options, balance their approach with key policies, solicit input from the community, track regulatory constraints, understand changes to business processes and more fully articulate the potential benefits and cost savings that municipal wireless can bring to their community.

Should a city deploy a citywide wireless infrastructure, the applications leveraging this infrastructure can determine the real value of the network through reduced telecommunication costs, increased productivity of employees, improved service delivery, more efficient and less expensive delivery of services and enhanced desirability for businesses and visitors.

Wireless access is rapidly changing how individuals and organizations connect to the Internet and is a transformative technology that can have benefits across all segments of the economy and civic life. Cities have the opportunity to make this a reality for their residents, businesses, children, visitors and most of all, for their futures.

Now is the time to move forward. MW

hot gadgets

New devices to take advantage of WiFi ubiquity

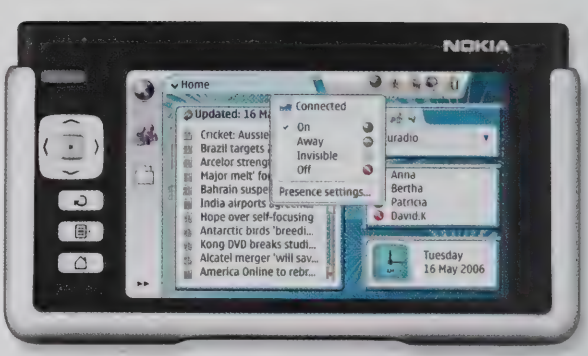
by Andy Abramson

When it comes to connecting to the Internet, devices have pretty much consisted of those that sit on a desk or those that can fit in the palm of a hand. They also have been, for the most part, developed to support data first and everything else second, in design, form factor and style. Not anymore.

With the advent of muniwireless deployments around the globe, plus the rapid proliferation of public and private WiFi hotspots, along with the ever rapidly exploding use of 802.11 in homes, offices and university campuses, access to WiFi is now becoming as ubiquitous as Starbucks and McDonalds.

That makes the idea of always staying connected with something other than a personal computer less the exception and more the rule, especially as more purpose-built devices, with easy-to-use software and consumer-friendly design, begin to take hold.

With each new Internet access location, there are even more places for more devices to be used. New hardware capable of riding on the wireless waves is starting to appear on store shelves and Web shops. Each new generation provides for a better user experience, delivering even higher quality and functionality than ever before. Here's a look at some of the hottest new gadgets, what they can do and how they might add fuel to the muniwireless revolution.



Personal Computers: Tiny In Size, Light in Weight

While the personal computer normally finds its way to the desk, the newly released "personal size" **Vaio PC from Sony, the VGN-180P,** leads the way in power and functionality, packing the full feature set and capabilities of a Windows XP computer into a device that weighs less than two pounds. Along with the OQO pocket computer, these new pocketables make the idea of full-blown, Internet-connected, personal-computing-on-the-go a true reality.

While the OQO is less than a pound, the slightly heavier Sony offers a more robust experience, as this wolf in sheep's clothing is nothing to take lightly. Its Intel single core processor hums along as fast as higher-powered computers of a year ago. The WiFi chipset lets the Vaio connect to WiFi access points in a snap and the advanced audio circuitry makes it sound as well as any cell phone (or better).

Sony even went so far as to design the speaker and microphone in such a way that they position next to your face just like a telephone. But the sound and video are the two factors that set the Vaio apart from the OQO. The letterbox-like screen makes it easy to watch streamed video content, while the sound system gives you all you need when you tune into Yahoo! Music JukeBox or Real's Rhapsody, anywhere you are.

Something Different From Nokia: A Linux-Based Portable

Then there is the **Nokia 770 Tablet.** With a Linux core, a tiny size and a new 2006 operating system as of July, the 770 is the type of Internet appliance that lets you do almost everything you want—browse and surf the Web, stream media, make phone calls, send e-mail and chat—all in a pocket-size powerhouse.

While not the "lean forward" PC replacement that is the Sony 180P, the Nokia Tablet is meant to be a perfect "lean back" Internet device for when you need to do something fast. Need a sports score? No problem. Want to check the weather? It's there. Need the time? Just like your cellular phone, the time is displayed, all the time.

But it goes much further than that. Because of the 770's Linux lineage, new applications are appearing almost every day. Gizmo Project turns a 770 into a phone that lets you place and receive free calls to other Gizmo Project and SIPPhone users. If a Gizmo In number is added, and Gizmo Out minutes are purchased, the 770 then becomes like a real phone, able to place and receive telephone calls any time it's connected to the WiFi network. And there's still more. With the 770, just like a PC, users of the MP3Tunes Music Locker can access their music store on a WiFi network, and listen to their cool tunes on the 770 too, all the time they are wandering around a hot zone.

Dual-Mode Phones, USB PhoneSticks and More

Not to be left out, Motorola's dual-mode GSM/GPRS phone, the A910, delivers a full suite of intuitive productivity tools. Offering WiFi connectivity, the A910 enables listening to MP3 tracks plus the opportunity to create a personalized soundtrack that can be simultaneously played alongside a selection of your favorite photos that you can take with the 1.3-Megapixel camera with flash. You can also manage e-mail and stay mobile: The A910 does everything from text messaging to e-mail management. The Motorola A910 packs a next generation Linux-Java operating system, Bluetooth wireless technology, J2ME performance and enhanced text-prediction features for a simplified yet powerful mobile experience.

As municipal networks proliferate, the need to cross over easily to other wireless networks will be critical. Fixed Mobile Convergence is that sector and **BridgePort Networks' MobileSTICK application**, based on joint collaboration with Oberthur, turns a laptop into a mobile phone. The MobileSTICK solution, targeted at the mobile workforce, enables users to place and receive calls from their PC or laptop using their mobile phone numbers. The MobileSTICK application is housed in a USB key and contains an embedded SIM card that can be branded by the service provider. When connected to a WiFi hot spot, with mobile carrier cooperation the MobileSTICK and BridgePort Networks Nomadic One technology enable the WiFi cloud to appear as a roaming extension of the cellular network.

With the MobileSTICK and BridgePort Networks' SoftMOBILE solution, and a partnership with Oberthur Card Systems, users are always reachable over an Internet connected endpoint (i.e. soft client, IP phone, etc.) or mobile phone using a single identity without the need for a separate VoIP or landline number.

Fonav, a start-up company in Mountain View, Calif., is doing for WiFi what the RIM Blackberry did for mobile. Fonav's Communications 2.0 technology turns WiFi phones from leading brands into a personal communication center. VoIP, instant messaging and e-mail become accessible to users whenever the device is on the WiFi-connected Internet.

Andy Abramson is the author of Andy Abramson's VoIPWatch (http://andyabramson.blogs.com/voipwatch), Working Anywhere (http://andyabramson.blogs.com/working_anywhere) and co-hosts the daily Ken Radio World Technology RoundUp (www.kenradio.com) when he's not advising clients for his Del Mar, Calif.-based marketing communications agency Comunicano Inc.

Next-Generation WiFi Phones

WiFi phones from UT Starcom, Zyxel, Netgear and Linskys provide consumers a new cost-effective way to communicate, with traditional telephone features such as three-way calling, call waiting, call transfer and many other popular features.

The UT Starcom F1000 is a residential WiFi handset with a candy bar cell phone form factor. The **UT Starcom F3000** is a new residential WiFi handset with a clamshell-type design that supports 802.11b/g, SIP, SDP, RTP, DHCP and TFTP. This more stylish and versatile model sports a color screen and supports many advanced call features that the Voice 2.0 movement is creating.

The Netgear Skype WiFi Phone enables Skype calls without a PC. Unfortunately, due to a lack of two-stage authentication in the first release, the ability to log on to protected, closed networks makes these phones more useful in home WiFi networks. However, it is anticipated that by late fall software from Fonav and possibly others will make these phones more appealing to muni WiFi operators such as EarthLink, which has already planned for voice-over-WiFi to be a part of its business in San Francisco, Anaheim and Philadelphia.

Linksys' WIP300 offers users a large, full-color high-resolution display, along with an intuitive user interface enabling users to easily and quickly configure the handset. Handset features include caller ID, call forwarding, call transfer and memory that stores call history and can save 200 phone book entries. The Linksys WiFi phone can also be personalized with a selection of ring tones and different wallpaper images.

PDAs With Power

The **UBiQUiO 501** is a Windows Mobile 5.0 PDA that combines WiFi with GSM/GPRS/EDGE, all in one pocket-size device. It uses the Pocket PC form factor, but it's not as robust as the Hewlett-Packard HP iPAQ hw6900, which has a much faster processor. Since Windows Mobile Pocket PCs sport a mobile version of Internet Explorer, it's a snap to log on to commercial Web sites and muniwireless networks that require a user name and password.

WiFi Cameras

Cameras too will be WiFi ready. Already **Nikon has announced the COOLPIX S7c** that will connect to WiFi networks. This is great for people visiting tourist locations that have WiFi access and want to send a photo home via e-mail. In addition to Nikon, Kodak has also entered this space.

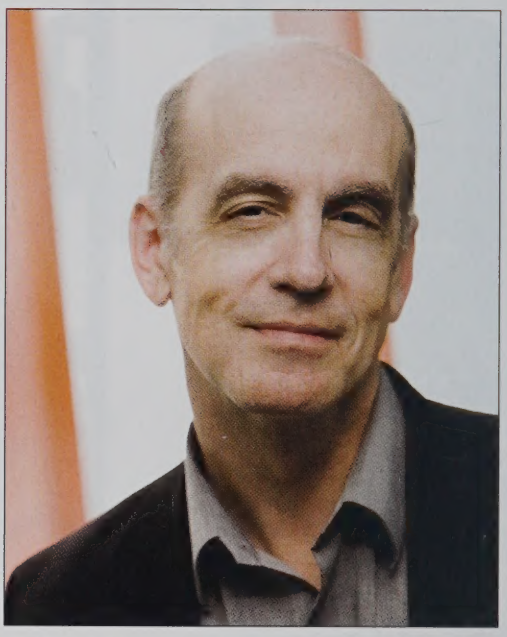
Devices for a Connected World

With all these devices, users of municipal WiFi networks will be able to operate as if they are on their own personal networks, just as they do at home or work. The advent of more sophisticated devices and appliances, and with better battery life, will only make for a better and longer-lasting experience. And, as this new hardware and software comes to market, the benefits of muniwireless will have even more positive impacts on a greater number of people around the globe in a more connected way. **MW**

infrastructure 2.0.

Designing the next IT upgrade.

by Gary A. Bolles



At each of our three conferences in the past year, *MuniWireless* founder Esme Vos was fond of saying that public broadband represents "the next major IT upgrade." To some, an "upgrade" might sound like a small, incremental step—some new hardware added here, some revised software added there.

But muniwireless and related efforts are no "point release" upgrades, as the technology marketers are fond of calling minor updates. This is an upgrade of seismic proportions, and so it's critical for anyone involved in the public broadband ecosystem to understand what happens in an initiative of such scale.

I used to be editor-in-chief of *Network Computing* and later was a frequent contributor to *CIO Insight*. I've spent countless hours talking with corporate CIOs and their staffs about the challenges and opportunities of major upgrades, and the strategies they use to ensure their success. After you've heard dozens and dozens of war stories, a few consistent themes emerge.

First, it's essential to conduct a comprehensive inventory of all of the major existing technology "assets" in a municipality. That's devilishly hard to do in a small organization, and a seemingly insurmountable task in a municipality of any substantial size. Each agency often has its own infrastructure, and even doing a reasonable list—much less conducting a thorough analysis—can be daunting. But it's critical to know what you're building on before you start to upgrade it.

The next step is planning for a consistent architecture—a strategic plan that melds together all of the current pieces, and projects a view of what the future should look like. Every organization is different in how it envisions that plan, but there are certain crucial components:

- It needs to state certain rules for how all of the players will acquire and use technology going forward. Without those standards, expedient decision-making will force short-term thinking, with the inevitable—and costly—results of incompatible systems.
- It has to define governance requirements, outlining how major constituents such as agencies and providers will regularly agree on new technology-related decisions. It's critical that all important players have a seat at that table, to provide input on their needs.
- It has to include a roadmap that shows how everything will converge around those standards and those decisions over the long haul.

Like any process that involves multiple and often conflicting organizations and perspectives, making a major upgrade work requires a lot of face-time and group consensus. In fact, if this sounds to you a lot like a city planning process, you're right: Infrastructure is infrastructure, whether you're talking about roads, buildings or networks.

So, think of your city, town or county's existing communications and computing technology (if it has much) as "infrastructure 1.0." In many cases, the decisions about that infrastructure were made long ago—or in the case of third-party providers such as cable, wireless and telecommunications carriers, they were made by corporations over which municipalities exercised only minimal control, in return for an infrastructure they never would own.

Your chance with Rev 2.0 is to do it right, getting the various constituents who touch your public broadband initiative to rally around the vision of an upgrade that will satisfy all of their needs. What's so significant about this upgrade is that it's the first wave of network deployment specifically directed by municipalities, for municipalities. And that's an upgrade to be upbeat about. MW

GARY BOLLES IS CO-FOUNDER AND PRESIDENT OF MICROCAST COMMUNICATIONS INC., AS WELL AS EDITORIAL DIRECTOR OF MUNIWIRELESS MAGAZINE. HE CAN BE REACHED AT GARY@MICROCAST.BIZ.

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